More results from ensemble SCM simulations of TWP-ICE

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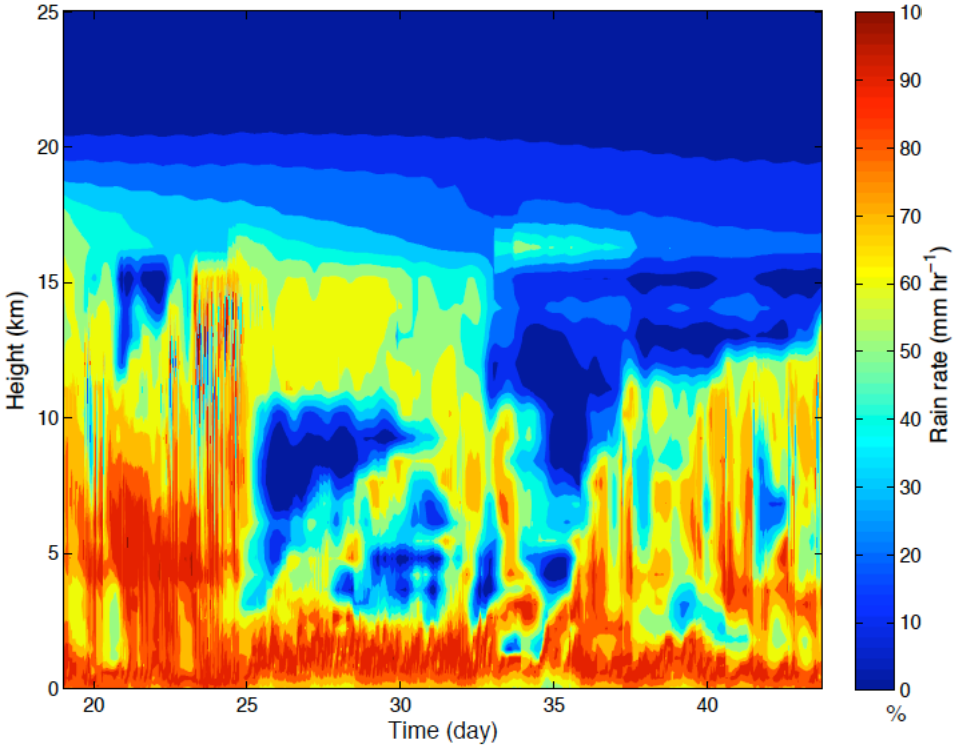
November 2008

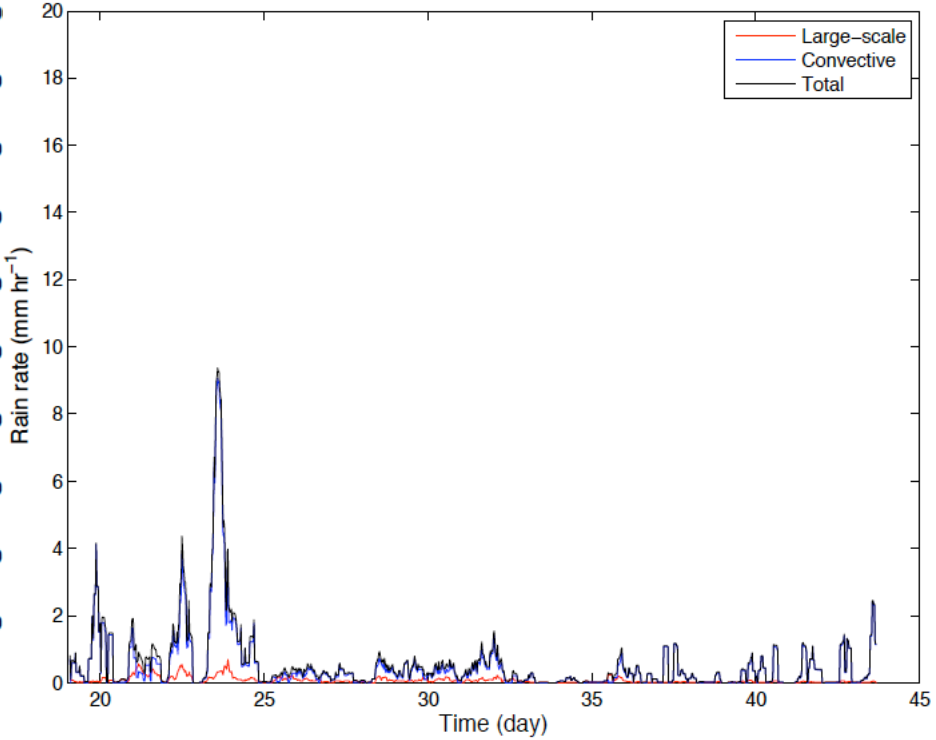
SCM setup

- SCM UM v6.3
- Prescribed advective tendency of Θ and q
- Horizontal winds relaxed on 2 hr timescale
- Fixed SST 29 ^{o}C
- Simulate 1 control (best estimate)
- And 100 ensemble members

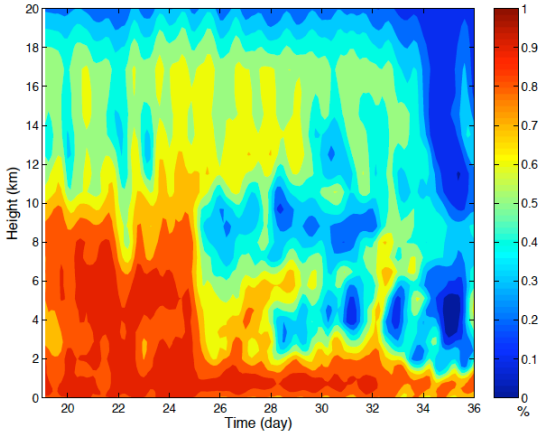
Control simulation



Relative humidity



Surface rain rate



CRM TC ends 3 Feb

(Day 34)

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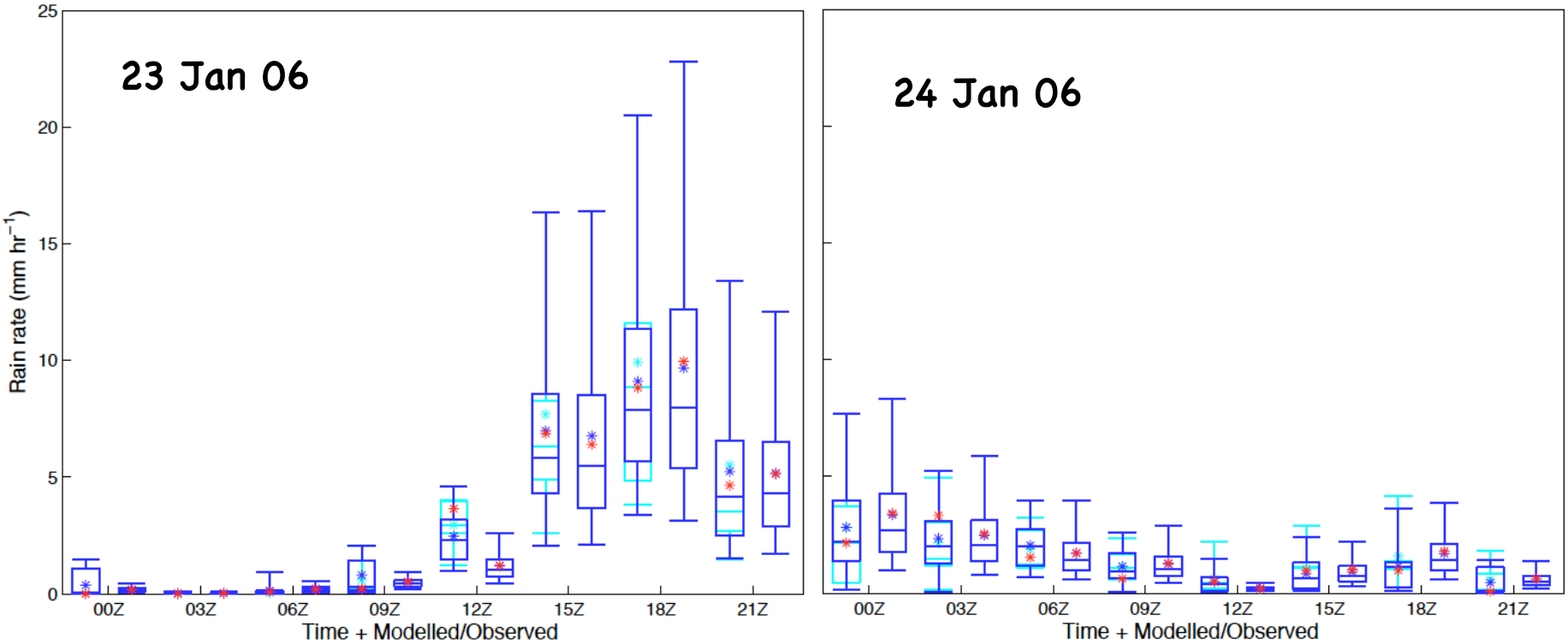
Ensemble rain rates

Passage of MCS



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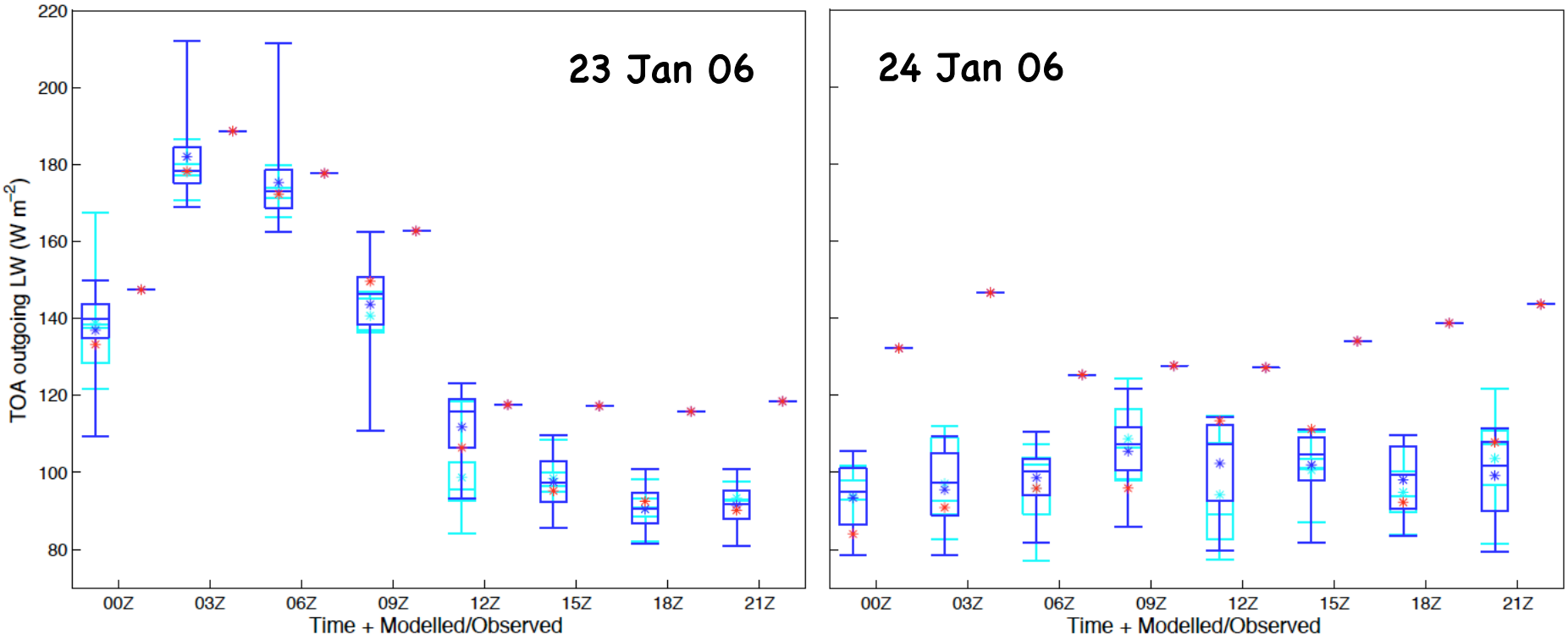
Ensemble TOA outgoing LW

Passage of MCS



Underpredicts TOA LW

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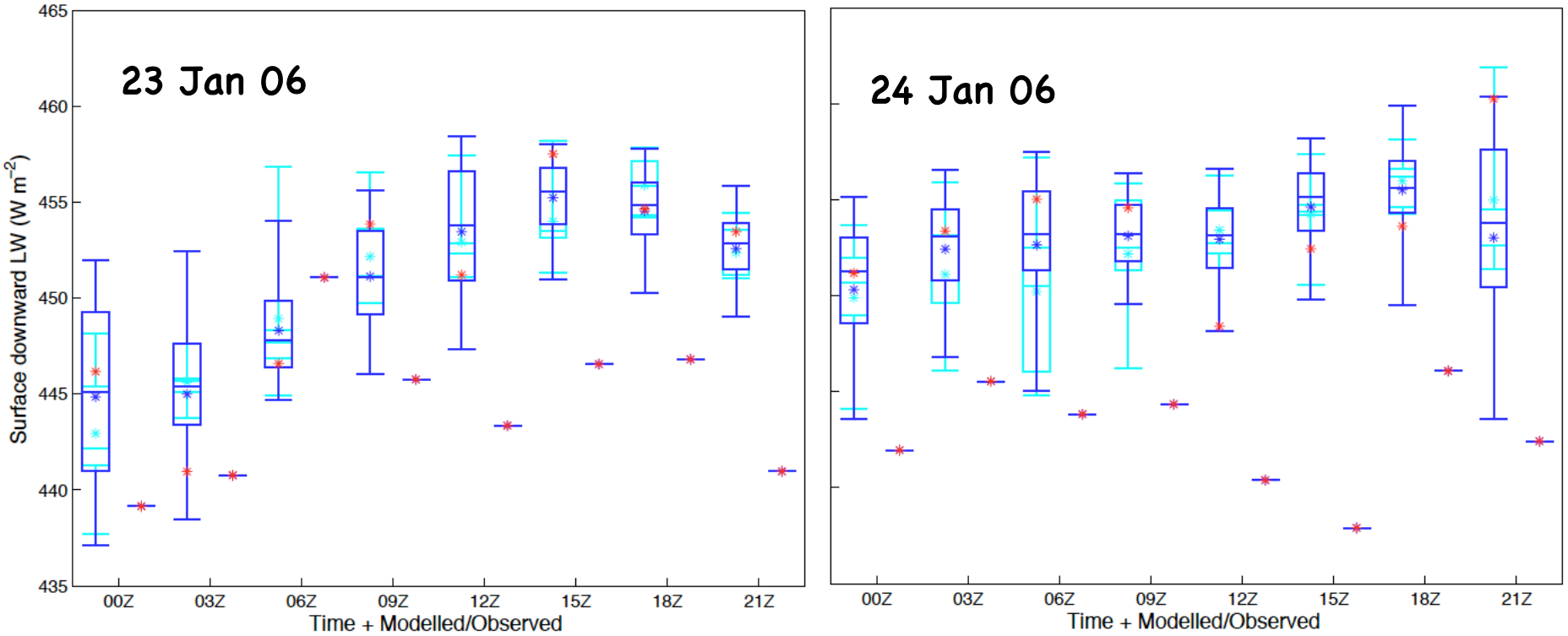
Ensemble surface LW (downward)

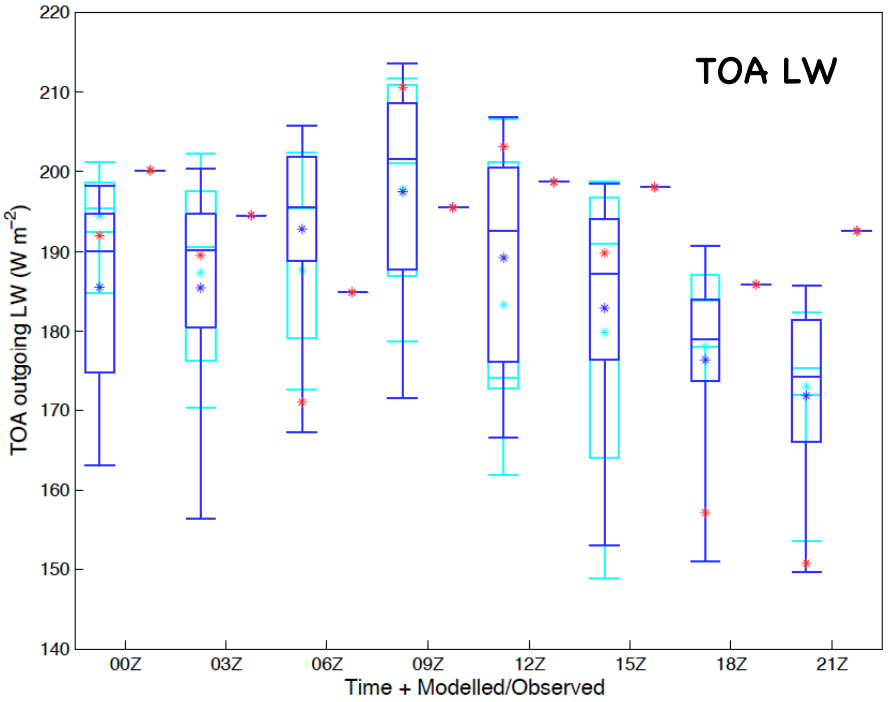
Passage of MCS

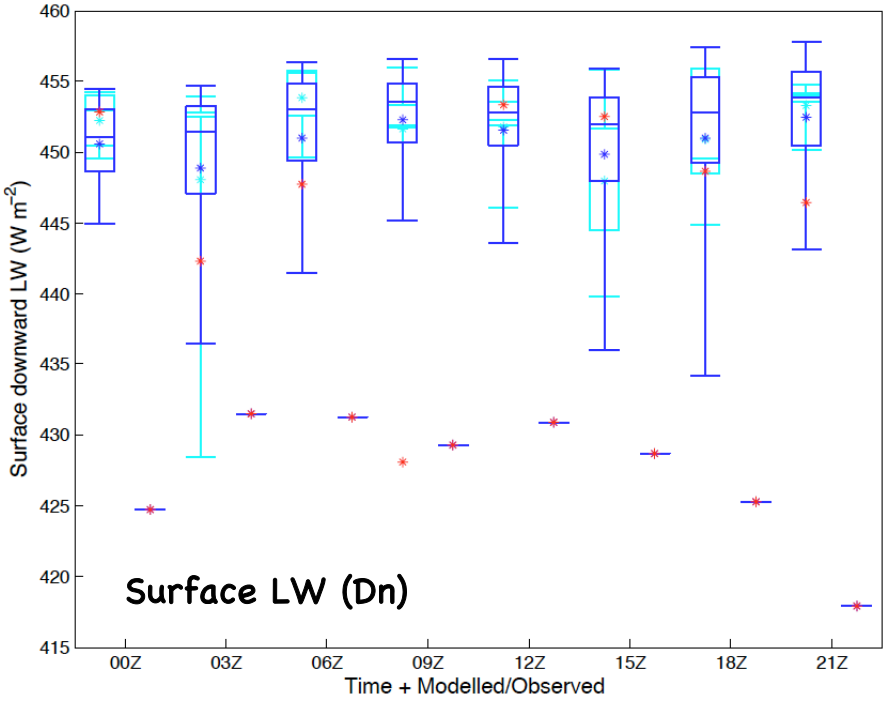


Overpredicts surface downward LW

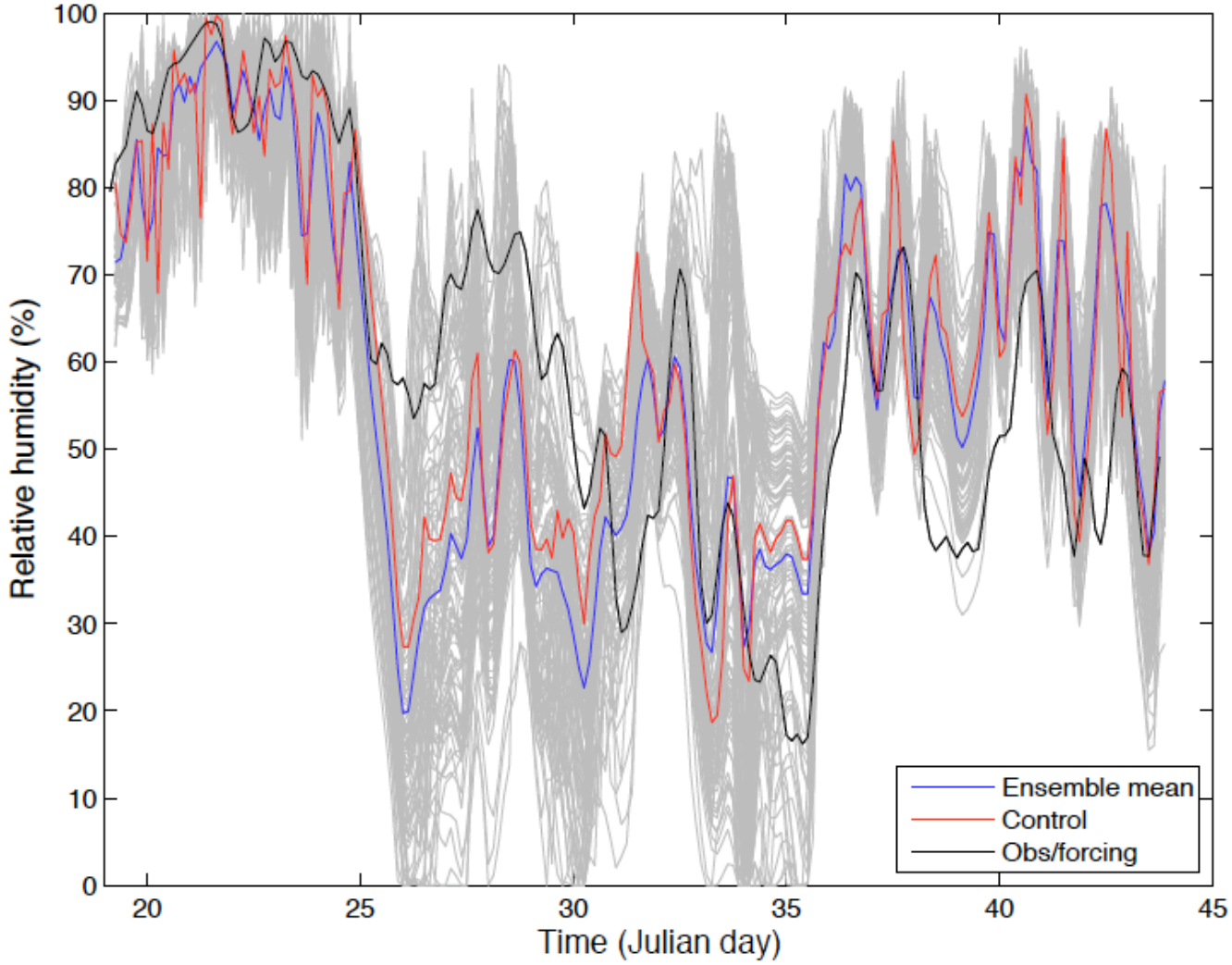
Suppressed monsoon period

27 Jan 08





Ensemble mean 500 mb RH



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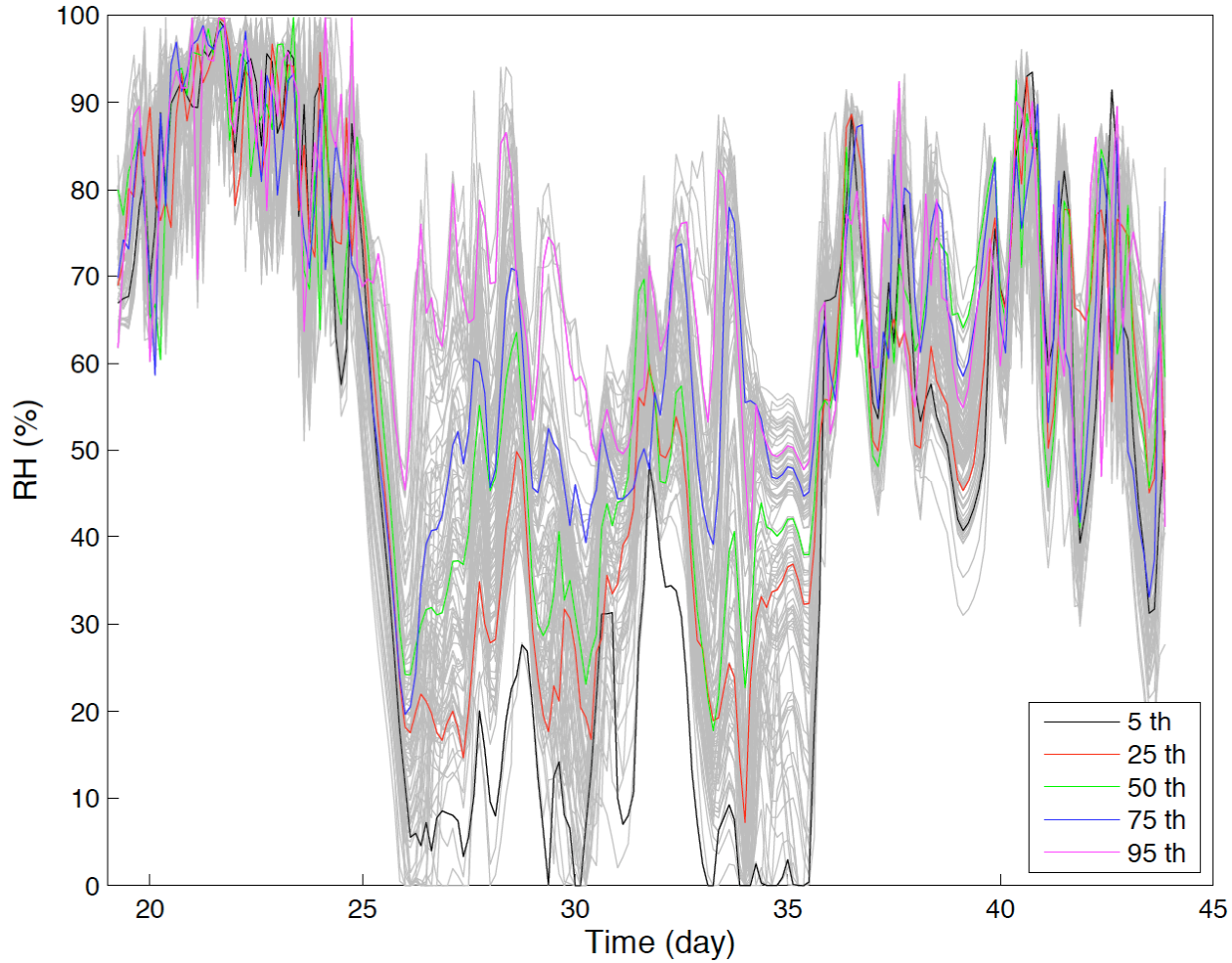
Ensemble 500 mb RH timeseries



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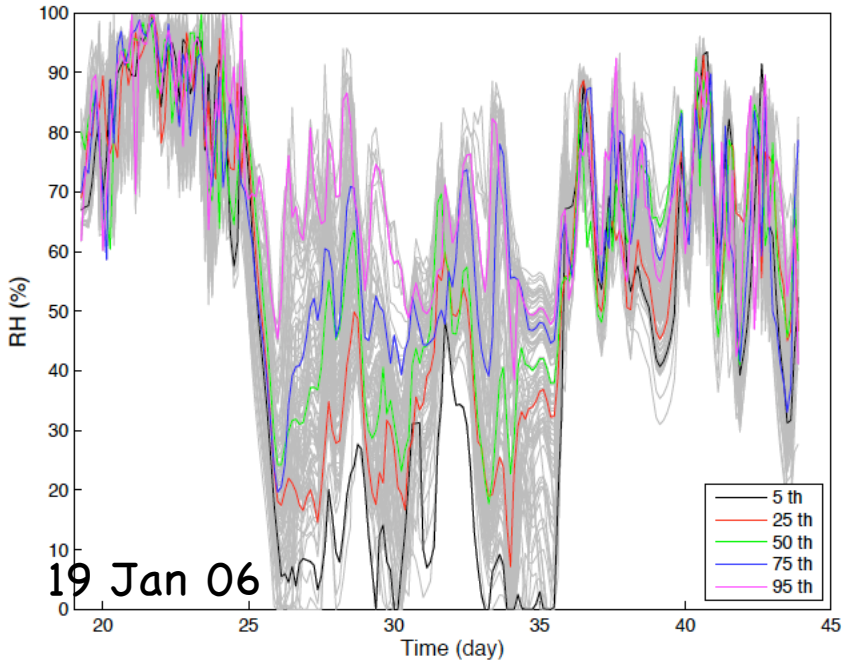
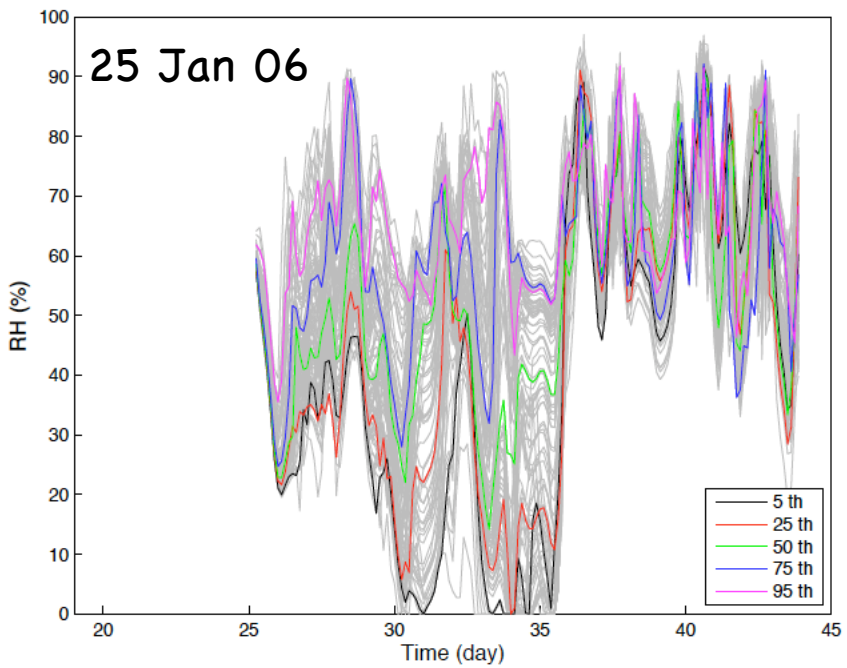
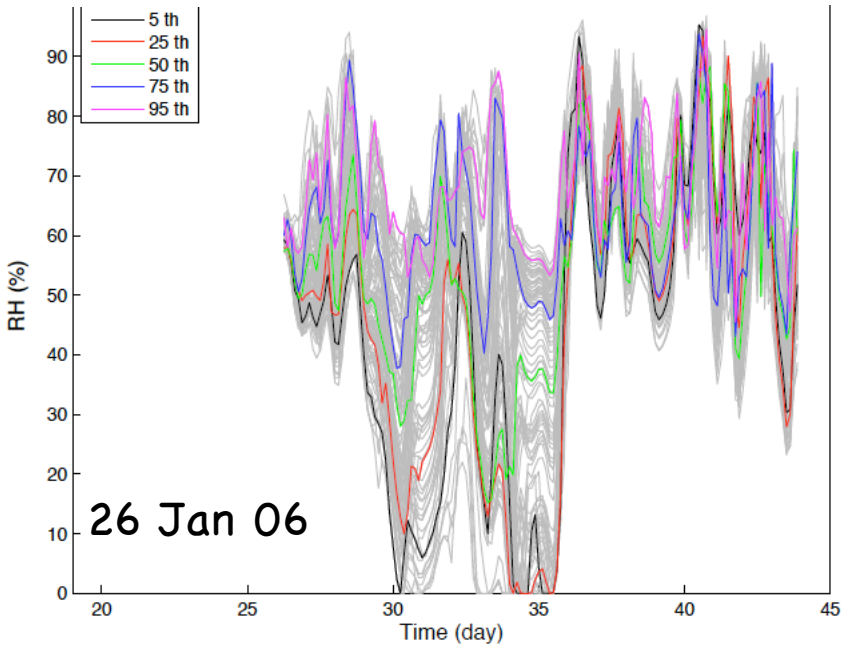
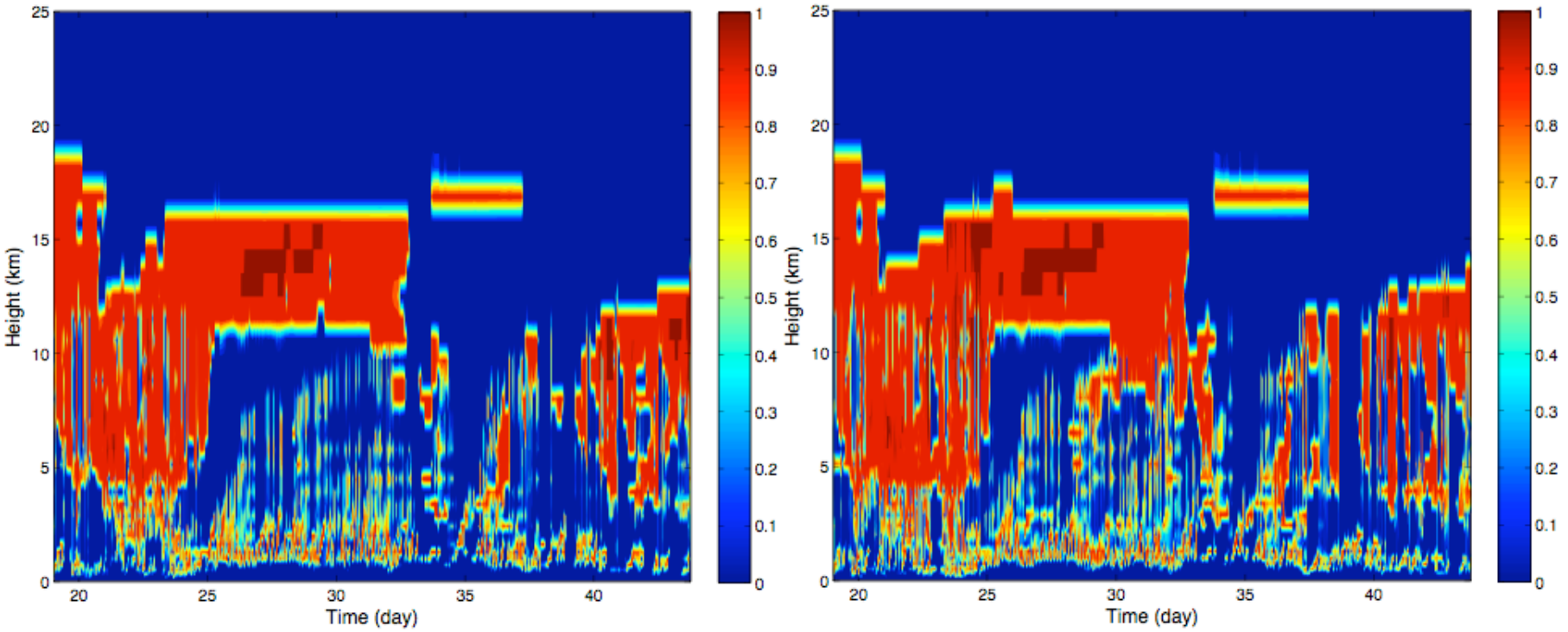
Effect of start time







Cloud cover



25 th percentile

75 th percentile

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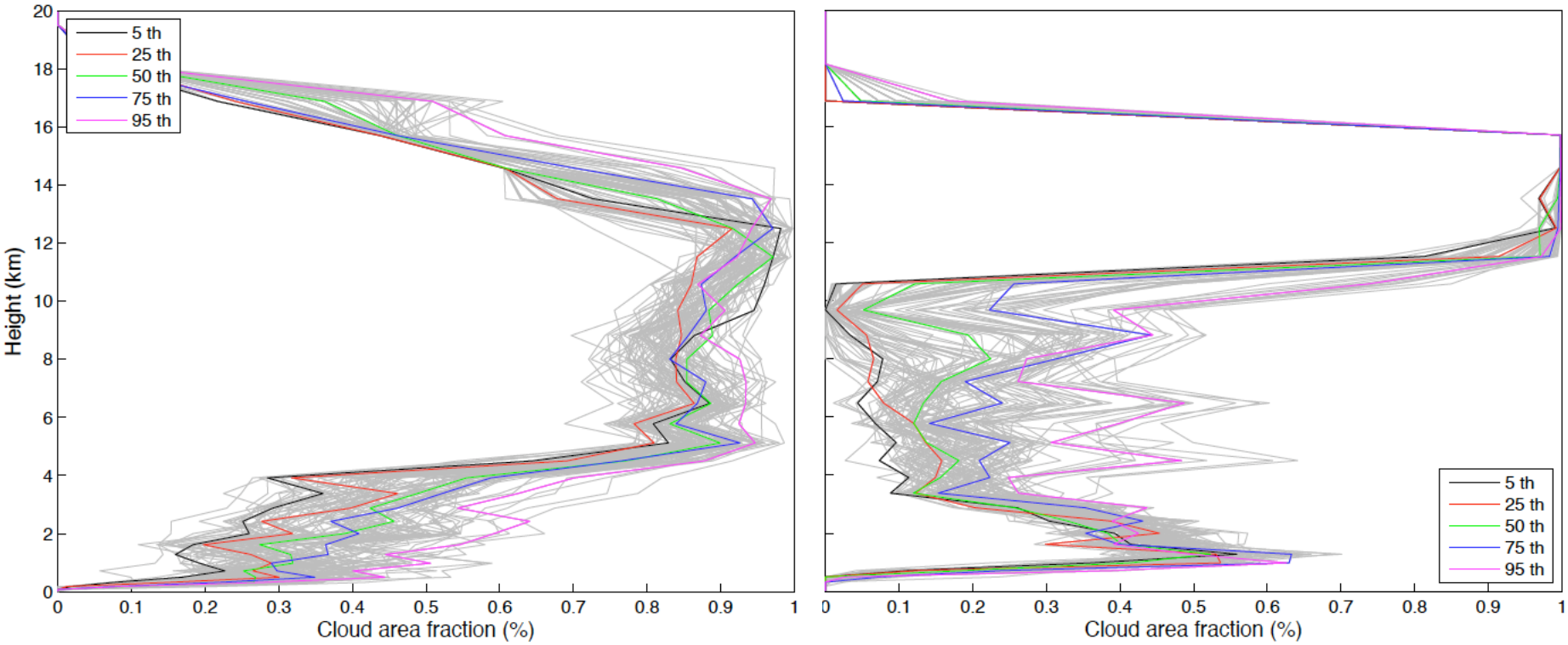
Vertical cloud distribution



Active monsoon

Suppressed monsoon

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Summary

- The ensemble model behaviour is found to have differing characteristics in different atmospheric regimes.
- During the suppressed monsoon there are large differences moisture between the ensemble members in the mid-troposphere.
- Ensemble members seem to agree in the active monsoon.
- This impacts on the representation of clouds and interactions with radiation.

Questions arising...

- Do other models have the same behaviour, particularly in the suppressed period?
- Do models have 'difficulty' with more weakly forced conditions?
- Or, is this how the real atmosphere might behave?
- If not, can we get some idea how/why the model develops this behaviour?

SCM testcase specification

- Run 100 ensemble members + 1 control simulation
- Forced by advective tendencies of Θ and q
- Fixed SST 29 ^{o}C
- Horizontal winds relaxed to profile
- Ozone profile - observed?
- How close should the SCM and CRM testcases be?
- For diagnostics focus on the radiative properties of the atmosphere and interactions with clouds?